KERR-McGEE CHEMICAL CORPORATION
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September 12, 1997

Ms. Brenda Pohlmann
Remediation Branch Supervisor
Nevada Division of Environmental Protection
555 E. Washington, Suite 4300
Las Vegas, NV 89101

Dear Ms. Pohlman:

Subject: Perchlorate Activity Status

Following is the current status of Kerr-McGee Chemical Corporation's activities regarding the perchlorate issue:

- KMCC prepared an on-site sampling plan which NDEP reviewed and commented on. The sampling was completed and results are currently being formatted into a report. NDEP, through their consultant IT, collected split samples at the sampling locations and will be able to compare the KMCC results to their own, providing information on the reproducibility of the analytical method for perchlorate.
- KMCC is preparing a sampling plan for soil to evaluate the impact of perchlorate on stormwater discharges to the Pittman Bypass.
- KMCC has initiated an investigation into remedial alternatives for reduction of perchlorate concentrations in water. A status summary of that report is attached and several treatment technologies are under evaluation.

Kerr-McGee is committed to act responsibly and cooperate fully with local, state, and federal officials in determining appropriate remedial actions. Please feel free to contact me at (702) 651-2200 if you have any questions related to this information. Thank you.

Sincerely,

Patrick S. Corbett
Plant Manager

By certified mail
cc: SMCrowley
EMSpore
TWReed
RANapier
ALDooley
Robert Kelso
Doug Zimmerman

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Technology Review

Biodegradation

The use of bacteria has been shown to reduce perchlorate and chlorate in water up to 15,000 ppm from bench scale to pilot scale. This technology is patented by the USAF and the transition to the private sector is under way. Patents in progress and pending in the private sector will make the industrial use of this technology easier. Treatability and operability testing is underway with our groundwater to characterize the necessary chemistry and economics of the anaerobic bioreactor. Pending successful testing of 2 months duration a decision will be made regarding pilot and scale up of this technology.

Catalytic Hydrogen Reduction

Hydrogen catalysis is a rather large body of scientific study. Hydrogen ion can be used to reduce chlorate and perchlorate in a catalysis reactor. Reactor (bench scale) design is underway and testing will continue for about 2 months duration. The proper catalyst for reaction with hydrogen in the presence of our groundwater is necessary for successful reduction of the chlorate and perchlorate contaminants. There also exists the possibility that electrochemical enhancement of the hydrogen catalysis reactor may be successful. Pending successful testing of either or both of these methods, scale up and evaluation will then be made.

Electrochemical Reduction

Utilizing proper current densities and preconcentration of the perchlorate and chlorate ions, reduction could be effected in an electrochemical cell. Chlorate reduction has been shown to occur on an iron cathode under the right environmental conditions. Perchlorate may also be reduced with the proper selection of cathode materials, such as tin, and precious metals, with minimal environmental effects. Low concentration of wastewater chlorate and perchlorate cannot be reduced because of diffusion control at the surface of the cathode due to hydrogen production. The use of an air cathode may eliminate this problem and solve the reduction problem. If these tests are successful, then further evaluation and scale up will be made.

Reverse Osmosis

Reverse Osmosis may be used to remove the chlorate and perchlorate from the groundwater. This is not a destruction technology and will have to be operated in concert with another destruction process. It is possible that the use of reverse osmosis membranes can be used with electrochemical reduction to effect concentration of chlorate and perchlorate for final reduction. Testing is underway to asses the level of removal of chlorate and perchlorate from the groundwater. Membrane selection and testing will take about 2 weeks to determine with testing beginning in October. Pending successful selection of a membrane and testing, further evaluation will be undertaken.

Ozonation

Ozonation has been discussed as a possible reduction method which has been successful with some chlorate streams from pulp mills. This is a technology which has not been tested with reduction of perchlorate. The levels of concentration of chlorate and perchlorate are not known at which ozonation is successful. This technology could be used with an RO system if proven successful in reduction. Testing of ozonation will be conducted in October on the groundwater